

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

a semiconductor substrate including first and second element-formation regions which are partitioned
5 by an isolation trench;

first and second lower gate insulating films formed on the first and second element-formation regions, respectively;

first and second floating gates formed on the
10 first and second lower gate insulating films, respectively;

an isolation insulating film which is formed at least in the isolation trench and which has a depression formed in an upper surface thereof;

15 an upper gate insulating film formed on the first and second floating gates; and

a control gate line including an opposed portion which is opposed to the first and second floating gates, with the upper gate insulating film being
20 interposed, and a portion located inside the depression,

the first floating gate including a side surface which is opposed to the second floating gate and which entirely aligns with a side surface included in the
25 first element-formation region and defined by the isolation trench, and the second floating gate including a side surface which is opposed to the first

floating gate and which entirely aligns with a side surface included in the second element-formation region and defined by the isolation trench.

2. The semiconductor device according to claim 1,
5 wherein the isolation insulating film includes an uppermost portion located higher than lower surfaces of the first and second floating gates.

3. The semiconductor device according to claim 1,
10 wherein the isolation insulating film includes an uppermost portion located lower than upper surfaces of the first and second floating gates.

4. The semiconductor device according to claim 3,
15 wherein the opposed portion of the control gate line is opposed to the upper surfaces of the first and second floating gates and is opposed to those portions of the side surfaces of the first and second floating gates which are located higher than the uppermost portion of the isolation insulating film.

5. The semiconductor device according to claim 1,
20 wherein the isolation insulating film includes an uppermost portion located higher than lower surfaces of the first and second floating gates and lower than upper surfaces of the first and second floating gates.

6. The semiconductor device according to claim 1,
25 wherein the control gate line includes a lowermost portion located lower than lower surfaces of the first and second floating gates.

7. The semiconductor device according to claim 1,
wherein the upper gate insulating film includes a
portion extended onto the isolation insulating film.

8. The semiconductor device according to claim 1,
5 wherein the depression is filled with the control gate
line.

9. The semiconductor device according to claim 1,
wherein the isolation insulating film has a thickness
smaller than a half of a width of the isolation trench.

10 10. The semiconductor device according to claim 1,
wherein the isolation insulating film is formed by CVD.

11. A method of manufacturing a semiconductor
device comprising:

forming a lower gate insulating film on a
15 semiconductor substrate;

forming a floating gate material film on the lower
gate insulating film;

patterning the floating gate material film, the
lower gate insulating film and the semiconductor
20 substrate to form first and second pattern regions
partitioned by a trench;

forming a lower insulating film having a first
depression in the trench;

forming an upper insulating film on the lower
25 insulating film to fill the first depression with the
upper insulating film;

etching the upper insulating film at an etching

rate higher than an etching rate of the lower insulating film to form a second depression corresponding to the first depression in the lower insulating film;

5 forming an upper gate insulating film on the patterned floating gate material films included in the first and second pattern regions; and

 forming a control gate material film on the upper gate insulating film and in the second depression.

10 12. The method according to claim 11, further comprising patterning the control gate material film, the upper gate insulating film and the patterned floating gate material films by use of a mask pattern substantially perpendicular to the trench.

15 13. The method according to claim 11, wherein the lower insulating film having the second depression includes an uppermost portion located higher than lower surfaces of the patterned floating gate material films included in the first and second pattern regions.

20 14. The method according to claim 11, wherein etching the upper insulating film includes etching an upper portion of the lower insulating film, and the lower insulating film after being etched includes an uppermost portion located lower than upper surfaces of
25 the patterned floating gate material films included in the first and second pattern regions.

 15. The method according to claim 11, wherein the

control gate material film formed in the second depression includes a lowermost portion located lower than lower surfaces of the patterned floating gate material films included in the first and second pattern regions.

5 16. The method according to claim 11, wherein forming the lower insulating film in the trench includes forming the lower insulating film outside the trench, and wherein the method further comprises
10 removing the upper and lower insulating films formed outside the trench before etching the upper insulating film.

 17. The method according to claim 11, wherein forming the control gate material film in the second
15 depression includes filling the second depression with the control gate material film.

 18. The method according to claim 11, wherein the lower insulating film having the first depression has a thickness which is smaller than a half of a width of
20 the trench.

 19. The method according to claim 11, wherein the lower insulating film is formed by CVD, and the upper insulating film is formed by coating.

25 20. The method according to claim 19, wherein the lower insulating film is made of silicon oxide, and the upper insulating film is made of polysilazane.